

REMARKS

Claims 1-41 are pending in the application; claims 36-40 are withdrawn from consideration; claims 1-35 and 41 are rejected.

The Examiner required a restriction under 35. U.S.C. to one of:
Group I -- Claims 1-35 and 41, drawn to an article; and
Group II-- Claims 36-40, drawn to a method.

The Applicant hereby affirms the election of Group 1, claims 1-35 and 41, with traverse.

The Applicant requests reconsideration of the restriction requirement because, as argued below, the element is novel and not disclosed in any references known to the inventors and offers advantages not offered by prior art elements. The novel product was designed for use in the process claimed. Although the element might conceivably be used in a different process, as the Examiner suggests, such use is speculative and success highly unpredictable, especially since the mechanism for how the conductivity enhancing agents actually work is not well understood and how electroconductive polymers are affected by conductivity enhancing agents is unknown.

Further, the element and the use of the element are so closely related that a search for one would necessarily overlap the search for the other. It would therefore not be burdensome for the Examiner to examine both groups of claims together, thereby achieving greater economy of time and money to the Applicant and the Office. The Applicant urges reconsideration of the restriction requirement.

The Applicant has updated the cross reference information in the first paragraph of the specification, as requested by the Examiner.

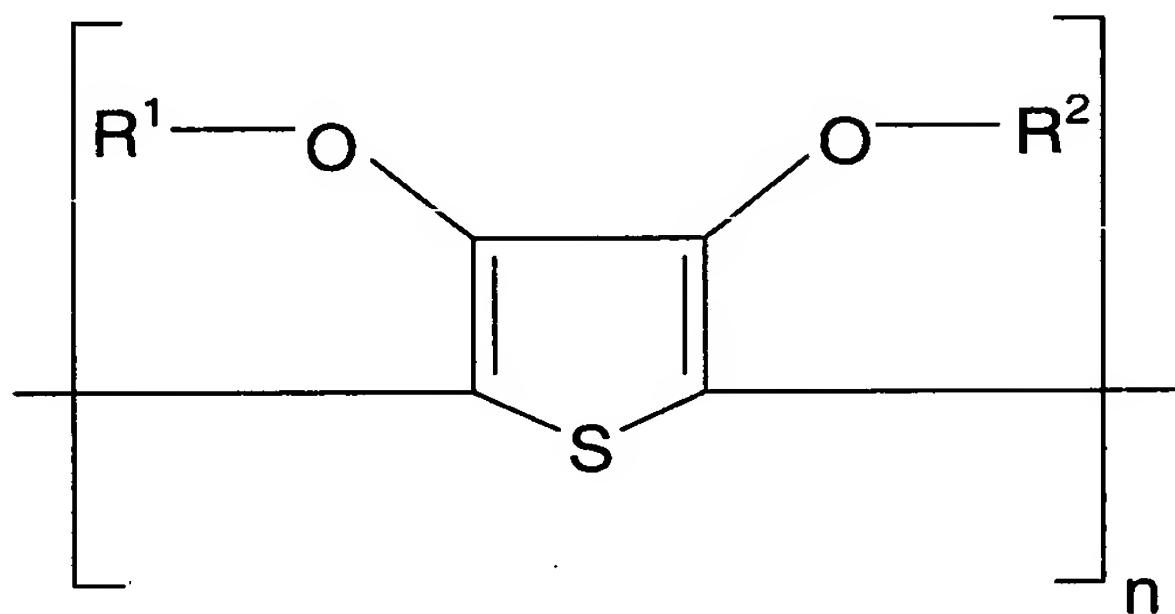
Claims 9 and 20 have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite. Claims 9 and 20 have been amended to overcome the rejection.

Claims 1-20, 22-30, 32-35 and 41 have been rejected under 35 U.S.C. 102(b) as being anticipated by Savage et al. (U.S. Patent 5,665,498).

The Examiner contends that the polymer disclosed by Savage et al. is the polymer of Formula I in instant claim 20 in which R1 and R2 are ethylene groups; and that the support, binder, coating methods and polymer coverage

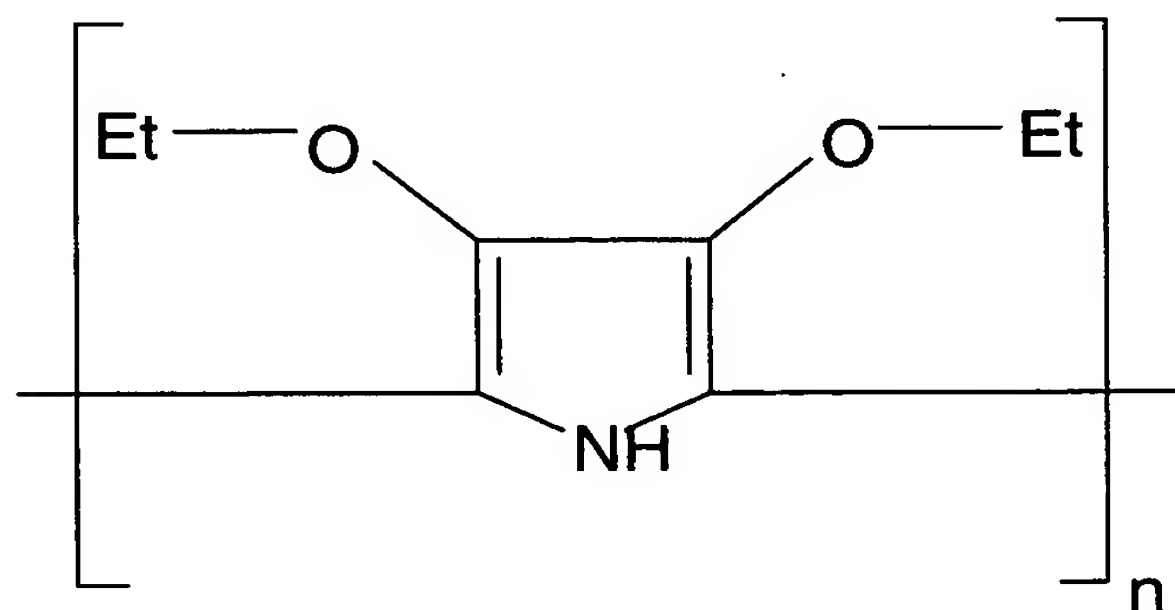
disclosed in the application are also similar to those in Savage et al. The Examiner says he takes the decrease in resistivity of the contacted areas (described in the application) to be a function of the polymer in the electroconductive layer and that since the instant polymer appears to be the same as the polymer in the reference, then the layer in the reference would also decrease in conductivity when contacted with a conductivity enhancing agent. This rejection is respectfully traversed.

The Examiner is incorrect in his statement that the polymer of Savage et al., i.e., poly(3,4-ethylene dioxypyrrole), is the same polymer disclosed in instant claim 20. These are not the same polymer as should be obvious from the structures below. Claim 20 represents the general formula of polythiophenes that are useful in the present invention; while the polymer of Savage et al. is poly(3,4-ethylene dioxypyrrole).



The present invention

Savage et al teach a substituted pyrrole as shown below.



Savage et al.

Moreover, Savage does not teach or suggest the use of his polymers in electrode applications, only in imaging applications. In col. 8, lines 54-59, the reference states that the layers "...provide antistatic properties to the electrically conductive layer". But the antistatic properties provided in Savage et al. are not sufficient for electrode applications, as taught by the Applicant. The lowest resistivity demonstrated in Savage's examples is 10^6 ohm/sq., typically 10^8 ohm/sq. In contrast, the two examples in the application disclose 10^3 ohm/sq. or lower after treatment with printing solution.

An important difference between the reference and the application is that Savage et al. teaches an antistat layer but fails to teach or suggest any type of patterning on this layer. On the other hand, the Applicant has invented an electroconductive layer for electrode applications and thus needs to provide a higher degree of conductivity. The Applicant's examples demonstrate that by using a printing solution, the surface resistivity of the electroconductive layer is lowered from $1 \times 10^6 \Omega$. The examples show that resistivity decreases by a factor of 1000 or more. Such high conductivity is not needed, and is not achieved, in Savage et al.

The claims have been amended to recite an electroconductivity layer with areas where surface resistivity has been rendered less than $1 \times 10^6 \Omega$. Foundation for the amendment can be found in the examples on page 10 of the application. The amended claims are distinguishable over the cited art and the rejection should be withdrawn.

The Examiner further observes that the limitations of the conductivity enhancing agent do not relate to the element since the element does not comprise the agent, but only responds when contacted with it.

The Applicant has amended the claims so that the element now comprises the conductivity enhancing agent. The limitations of claims 4-16 now pertain to the element as well as the agent.

Claims 1-23, 25-30, 32-35, and 41 have been rejected under 35 U.S.C. 102(b) as being anticipated by Jonas et al. (U.S. Patent 5,300,575).

The Examiner contends that Jonas et al. teach a composition comprising a polythiophene and a polyanion similar to the Applicant's; that the coating methods, binder, substrates and coating weight are also similar to those in the application.

The Examiner goes on to say that he takes the decrease in resistivity of the contacted areas (described in the application) to be a function of the polymer in the electroconductive layer and that since the instant polymer appears to be the same as the polymer in the reference, then the layer in the reference would also decrease in conductivity when contacted with a conductivity enhancing agent. This rejection is respectfully traversed.

Jonas et al. does not teach or suggest the use or benefit of conductivity enhancing agents as the Applicant does. On the contrary, Jonas et al. in col. 14, lines 34-35 states that one of the benefits of the conductive polymer of that invention is that “the conductivity of the polythiophene layer remains permanent” (emphasis added). *See*, col. 16. The present invention is designed so that the conductivity is not permanent; that it can be manipulated to form electrode patterns by contacting the electroconductive layer with a solution containing a conductivity enhancing agent. The examples show that resistivity decreases by a factor of 1000 or more after the application of a conductivity enhancing agent.

In Jonas’ example 12, the antistatic layer is coated with a “covering layer of PMMA” and then exposed to photographic development. This results in some limited increase in conductivity (reduced resistivity) after processing. However, in examples 11 and 13, when the antistatic layer does not have a “covering layer” prior to development, the layer becomes less conductive (higher resistivity) after development. The present invention does not teach application of a PMMA covering layer to the conductive layer prior to application of the printing solution containing the conductivity enhancing agent. In fact, such application is totally undesirable as it would prevent the increase in conductivity needed in the present invention.

In addition, Jonas et al. describes polymers for use in antistatic layers, not in highly conductive electrode applications. Jonas et al. does not teach or suggest the use of polythiophenes that are formed in electrode patterns.

In both Jonas et al. and Savage et al., the lowest resistivity value demonstrated in any example is greater than 10^6 ohm/sq. This is 1000 times less conductivity than is shown in the examples of the application after contacting the electroconductive layer with a printing solution. Layers taught in Jonas et al. and in Savage et al. are antistatic layers, not conductive layers for electrode

applications. The amended claims now recite a polymer layer with areas where surface resistivity has been rendered less than $1 \times 10^6 \Omega$. Foundation for the amendment can be found in the examples on page 10 of the application. The amended claims are distinguishable over the cited art and the rejection should be withdrawn.

The Examiner also observed that the limitations of the conductivity enhancing agent do not relate to the element since the element does not comprise the agent, but only responds when contacted with it. The Applicant has amended the claims so that the element now comprises the conductivity enhancing agent. The limitations of claims 4-16 now pertain to the element as well as the agent.

Regarding claims 26, 27, and 30, the Examiner observes that these claims further limit the composition of the binder of claim 20. However, the binder in claim 20 is an optional component. Therefore, the limitations of claims 26, 27, and 30 are met because the limitations of these claims are drawn to an optional component.

The claims have been amended to indicate that the limitations apply when the binder is present in the composition.

Claims 1-20, 22, 23, 25-35, and 41 have been rejected under 35 U.S.C. 102(b) as being anticipated by Cloots et al. (EP 1,054,414).

The Examiner contends that Cloots et al. teach an electrode pattern printed on a polymer; that polythiophene is the polymer used in one embodiment; that the coating weight, printing process, and substrate disclosed by Cloots et al. are also similar to those described in the application.

The Examiner goes on to say that he takes the decrease in resistivity of the contacted areas (described in the application) to be a function of the polymer in the electroconductive layer and that since the instant polymer appears to be the same as the polymer in the reference, then the layer in the reference would also decrease in conductivity when contacted with a conductivity enhancing agent. This rejection is respectfully traversed.

Cloots et al. teach the formation of patterns by contacting polythiophene layers with solutions that cause a destruction of the polythiophene conductive properties. Cloots does not teach or suggest the use of conductivity enhancing compounds; he describes just the opposite. After contact with Cloot's

printing solution, the layer is rendered essentially nonconductive. *See*, p.2, ll.49-51 and all the examples on page 4.

It is not clear how a reading of Cloots et al. would even suggest the use of a compound that enhances conductivity, least of all be relied on to support a 35 U.S.C. 102(b) rejection.

Further, the compounds suggested by Cloots et al. are strong oxidants (note that bromates, chromates are not particularly desirable from a health and safety standpoint) that may not even be desirable in an electrode unless it is to be washed out after the electrode pattern is made, which is a step not required in the instant invention.

Jonas et al. and Cloots et al. describe layers containing polythiophene, but neither teach or suggest the use or effect of conductivity enhancing compounds on polythiophene layers. None of the references teach making a layer with areas having conductivity levels as high as the areas described in the application; none teach the application of a conductivity enhancing solution; none teach the printing of electrode patterns on the electroconductive polymer layer.

The Examiner also observed that the limitations of the conductivity enhancing agent do not relate to the element since the element does not comprise the agent, but only responds when contacted with it. The Applicant has amended the claims so that the element now comprises the conductivity enhancing agent. The limitations of claims 4-16 now pertain to the element as well as the agent.

Regarding claims 25-30, the Examiner observes that these claims further limit the composition of the binder of claim 20. However, the binder in claim 20 is an optional component. Therefore, the limitations of claims 25-30 are met because the limitations of these claims are drawn to an optional component.

The claims have been amended to indicate that the limitations apply when the binder is present in the composition.

Claims 1-30 and 32 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 4, 21-23, and 25-30 of copending Application No. 10/648,418. The Examiner argues that instant claims 1-30 and 32 require only that when a printing solution containing a conductivity enhancing agent contacts the layer, the resistivity of the contacted areas decreases by at least a factor of 10. The

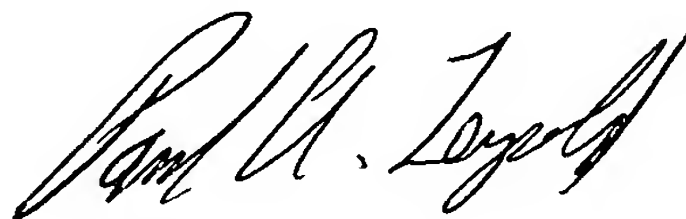
Examiner concludes that the electrographic developer and marking particles of claims 1 and 4, respectively, in Application No. 10/648,418 represent a species of the broad genus that is all conductivity enhancing agents. This rejection is respectfully traversed.

The Examiner is correct when he observes that the instant application discloses conductivity enhancing agents. Copending Application No. 10/648,418, however, discloses an agent that can enhance or degrade conductivity and is thus not truly a species of the present conductivity enhancing [only] agents.

The concept of patterning thin film electrode layers by the techniques of electrophotography, electrophoretic migration imaging and modulated electrostatic printing are not taught or suggested by the present invention, neither is any incentive given. Application No. 10/648,418 employed novel ideas and inventive skill in developing the techniques it claims and obviousness-type double patenting is not appropriate in this case.

The Applicant has invented a novel, non-obvious invention that deserves patent protection. The Examiner is respectfully urged to withdraw the rejections and issue an early Notice of Allowability.

Respectfully submitted,



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If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.